



# **ISUOG Basic Training**

## **Assessing the Neck & Chest**

# Learning objectives

At the end of the lecture you will be able to:

- Recognise the differences between the normal & most common abnormal ultrasound appearances of the neck in plane 6 (transcerebellar)
- Recognise the differences between the normal & most common abnormal ultrasound appearances of plane 7 (chest), excluding the heart

# Key questions

1. What are the key ultrasound features that describe the normal appearance of the fetal neck?
2. What probe movements should be used to distinguish between true & a false positive suspicion of nuchal abnormality?
3. What are the key ultrasound features that distinguish between normal & abnormal appearances of the fetal lungs?
4. Which abnormalities should be excluded after correct assessment of the neck & chest, excluding the heart?

# The 20 + 2 planes

Anatomical area	Plane	Description
Overview 1	Sweep 1	longitudinal head & body for initial orientation
Spine	1	sagittal complete spine with skin covering
	2	coronal complete spine
	3	coronal section of body
Head	4	transventricular plane*
	5	transthalamic plane*
	6	transcerebellar plane*
Thorax	7	lungs, 4 chamber view of heart
	8	left ventricular outflow tract (LVOT)
	9	right ventricular outflow tract (RVOT) & crossover of LVOT
	10	3 vessel trachea (3VT) view of heart

\* measurement required

# Requirements from each plane

Plane	Description	Structures to be evaluated <sup>2,3,4</sup>	Measurement <sup>1,2</sup> & criteria for referral	Abnormalities that can be excluded from the normal appearances of the section
6	Transcerebellar plane	Frontal horns of both lateral ventricles CSP Thalami Cerebellum Cisterna magna (normal range 2–10 mm)	TCD	Banana shaped/absent cerebellum (open spina bifida) Large cyst in posterior fossa Occipital encephalocele Cystic hygroma Skin oedema
7	Lungs	}		Left sided diaphragmatic hernia Congenital pulmonary airway malformation (CPAM) Significant pleural effusion (>4 mm) Significant pericardial effusion (>4 mm)
8	4 chamber view			
9	LVOT			
10	RVOT & crossover 3VT			

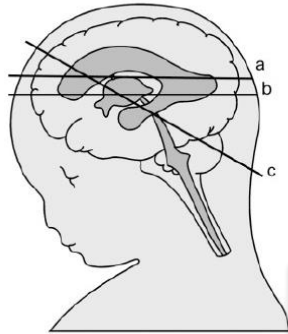
ISUOG Education Committee recommendations for basic training in obstetric & gynecological ultrasound, UOG, 2014, 43: 113-116.

Practice guidelines for performance of the routine mid-trimester scan, UOG, 2010, 37: 116-126.

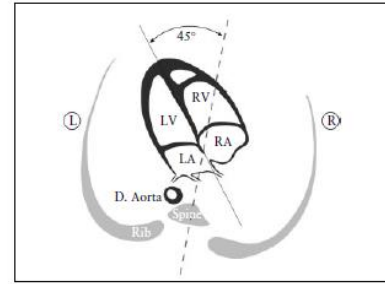
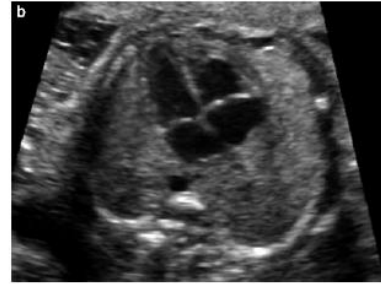
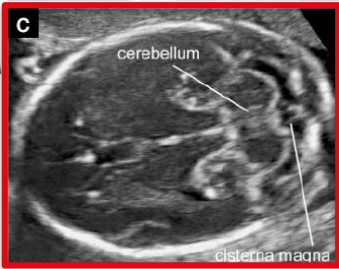
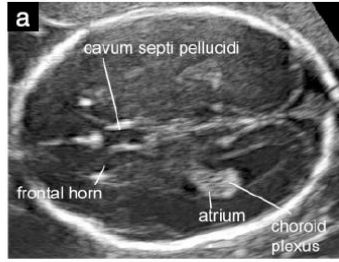
Sonographic examination of the fetal central nervous system, UOG, 2007, 29: 109-116.

ISUOG Practice Guideline (updated): sonographic screening examination of the fetal heart, UOG, 2013, 41: 348-359.

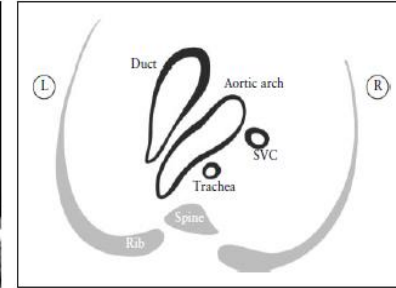
# Neck & Chest – planes 6 (transcerebellar) & 7 (chest)



Plane 6

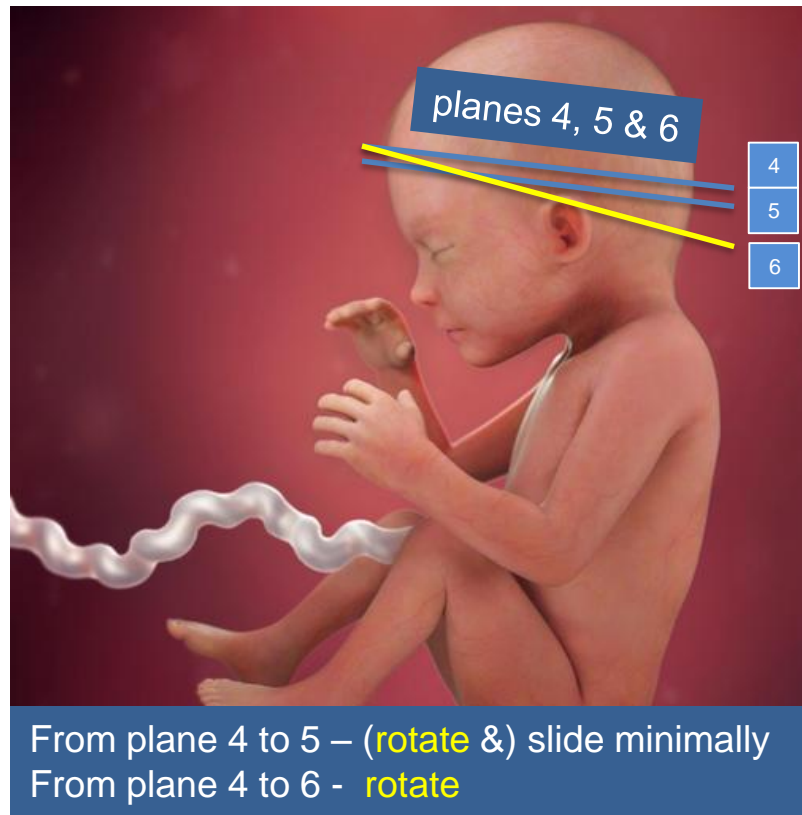


Plane 7



# Moving through the 20 planes

Plane	Description
1	Sagittal complete spine with skin covering
2	Coronal complete spine
3	Coronal section of body
4	Transventricular plane*
5	Transthalamic plane*
6	<b>Transcerebellar plane*</b>
7	Lungs, 4 chamber view of heart
8	Left ventricular outflow tract (LVOT)
9	Right ventricular outflow tract (RVOT) & crossover of LVOT
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\* measurement required

# Plane 6 (transcerebellar)

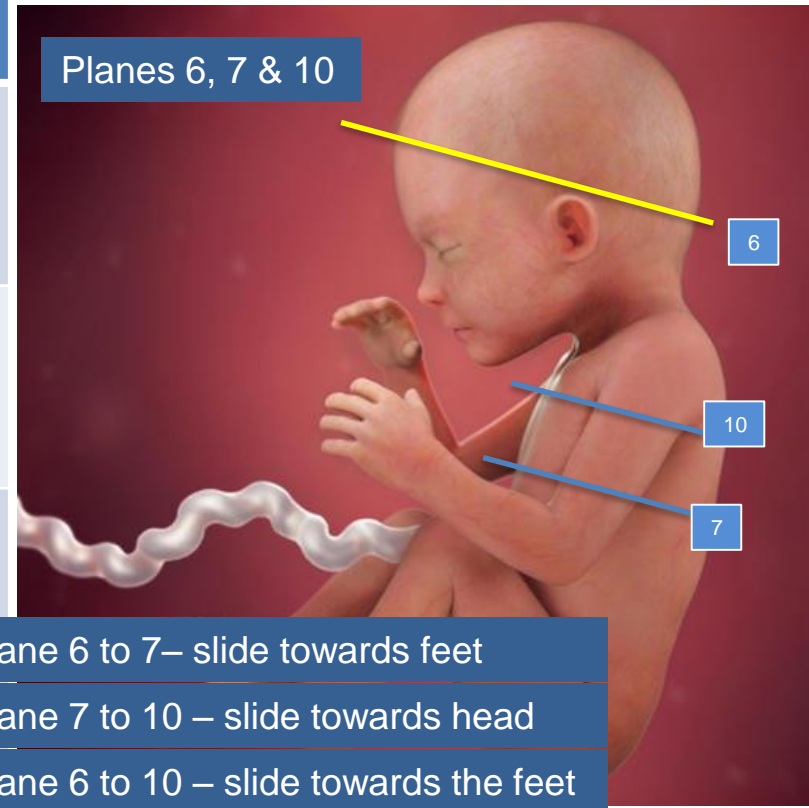
- Focal zone at appropriate level
- Image at appropriate depth
- Axial plane of the head
- Falx equidistant from both parietal bones
- CSP, thalami & cisterna magna visible
- Cerebellar hemispheres symmetrical
- Cerebellar vermis visible



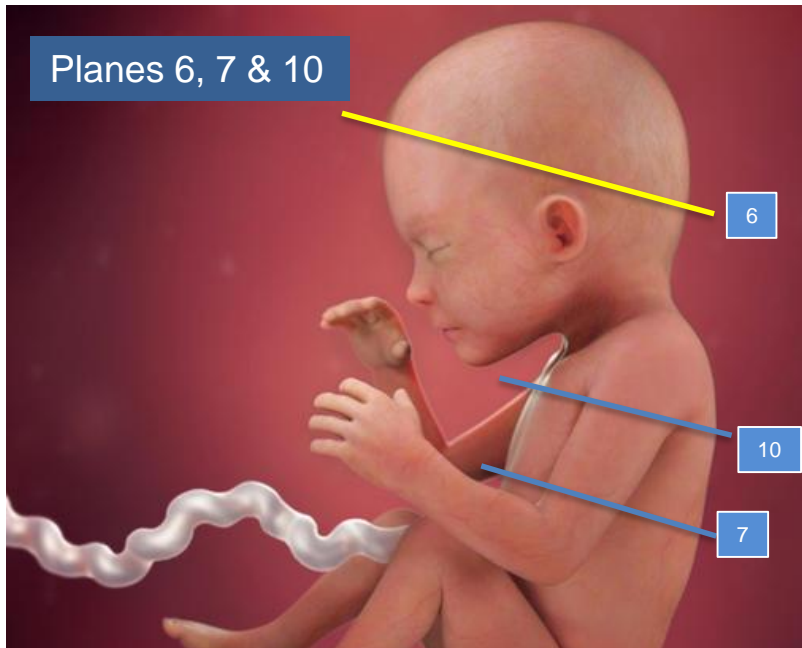


# Moving through the 20 planes

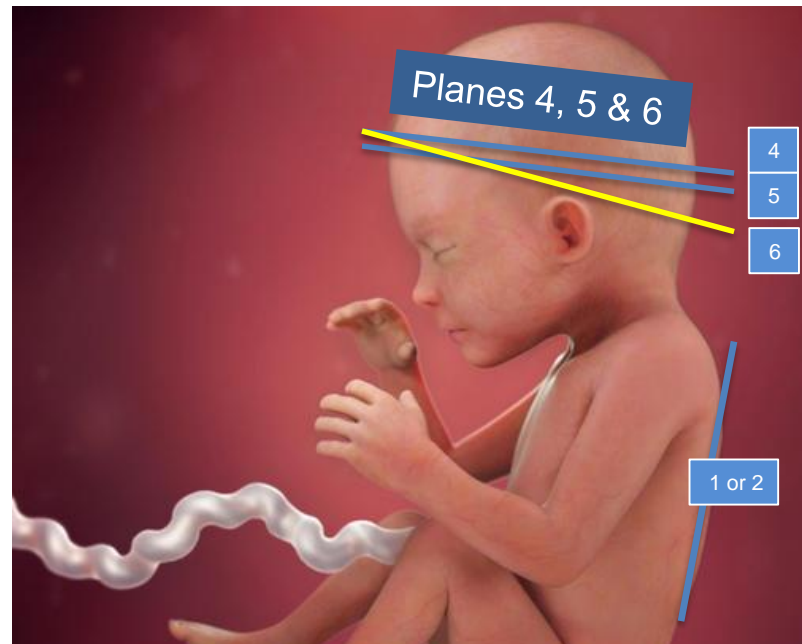
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# Moving through the 20 planes



From plane 6 to 7 - slide towards feet  
From plane 7 to 10 - slide towards head  
From plane 6 to 10 - slide towards feet



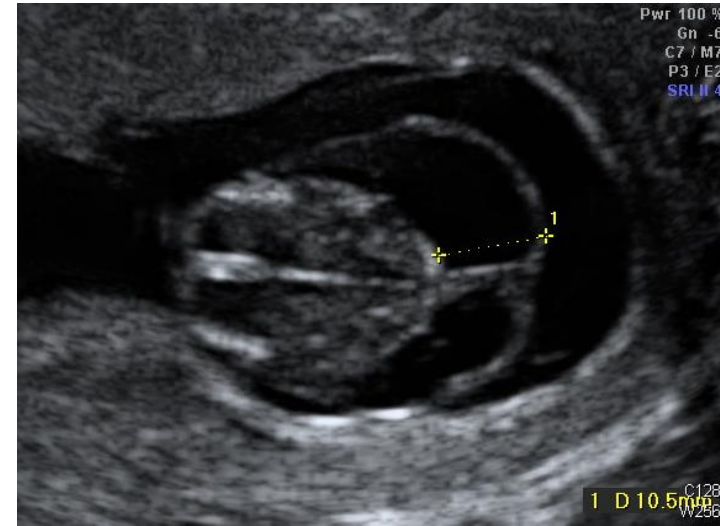
From plane 1 or 2 to 4 - rotate through 90°  
From plane 4 to 5 - (rotate &) slide minimally  
From plane 4 to 6 - rotate

# Which abnormalities can be excluded after correct assessment of the neck?

- Cystic hygroma
- Occipital encephalocoele
- Skin oedema



Cystic hygroma at 21 weeks



Cystic hygroma at 13 weeks

# Which abnormalities can be excluded after correct assessment of the neck?

- Cystic hygroma
- Occipital encephalocoele
- Skin oedema



Normal



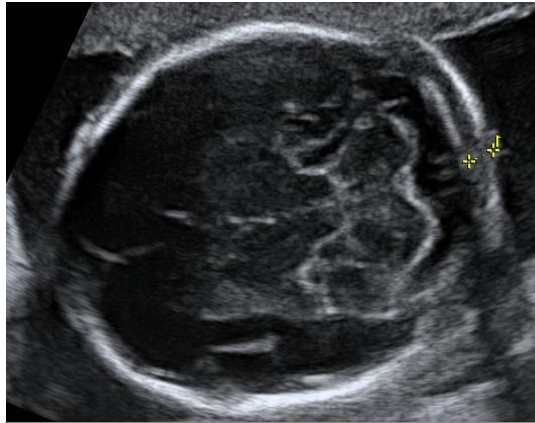
Occipital encephalocoele at 13 weeks



Occipital encephalocoele

# Which abnormalities can be excluded after correct assessment of the neck?

- Cystic hygroma
- Occipital encephalocele
- Skin oedema



Normal nuchal fold

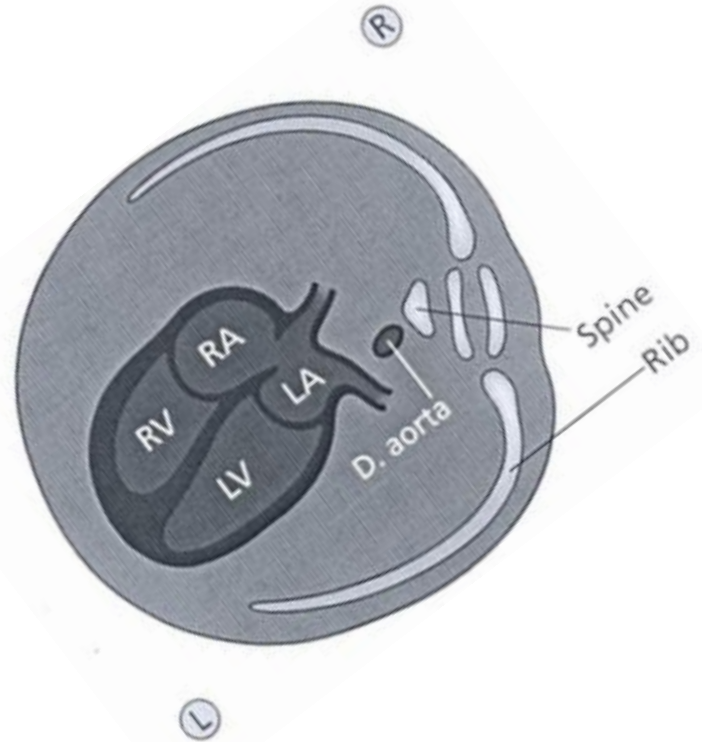


Increased nuchal fold at 19 weeks



Skin oedema at 16 weeks

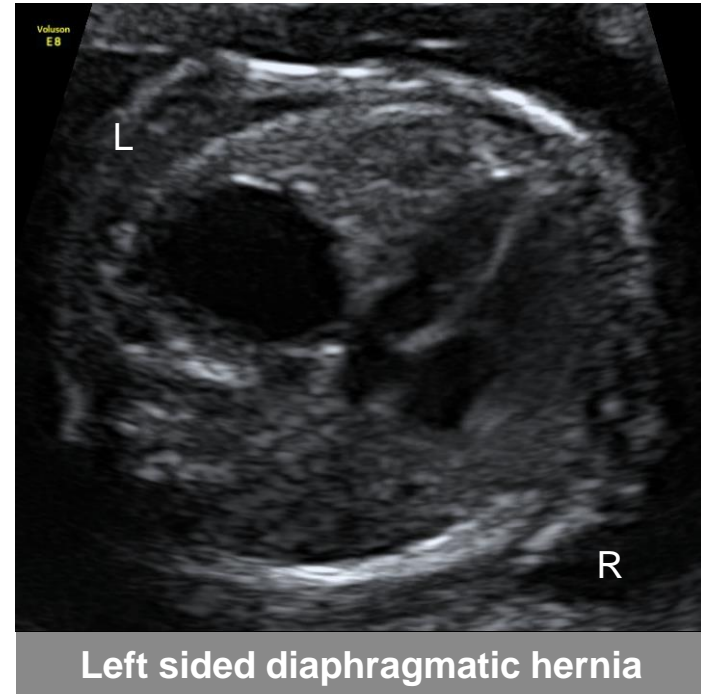
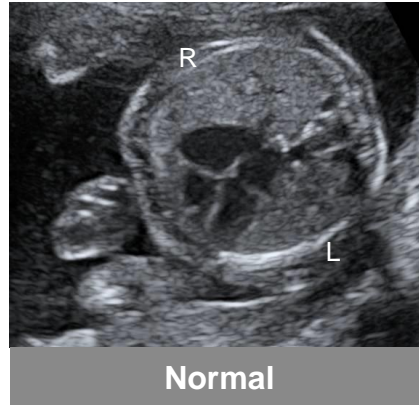
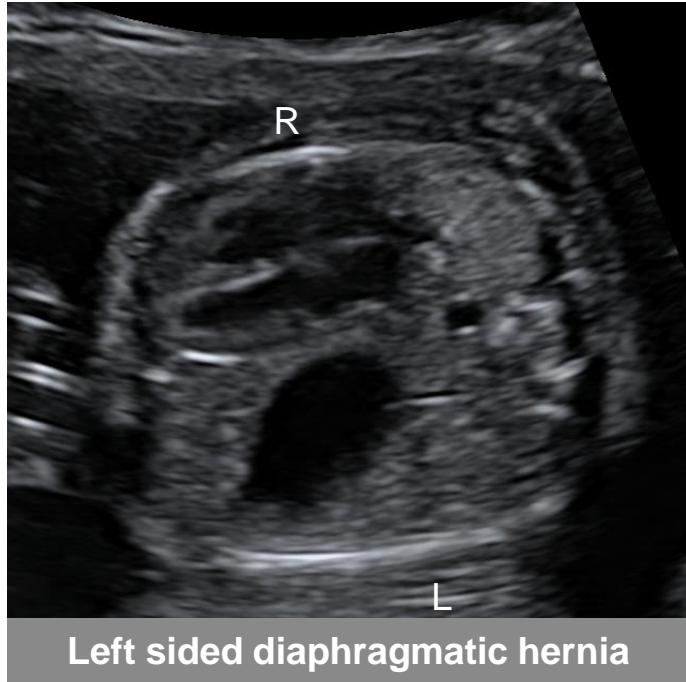
# Plane 7 (chest)



# Which abnormalities can be excluded after correct assessment of the plane 7 (chest)

- Left sided diaphragmatic hernia
- Congenital pulmonary airway malformation (CPAM)
- Significant pleural effusion (>4 mm)
- Significant pericardial effusion (>4 mm)

# Left sided diaphragmatic hernia





# Congenital pulmonary airway malformation (CPAM)

- Prevalence ~1:1500-4000 live births, male predominance
- Diffuse or localised
  - Type I : single or multiple large anechoic cysts with usually mediastinal shift
  - Type II: variable appearances depending on the composition of the malformation
  - Type III: homogeneously solid masses with normal adjacent parenchyma



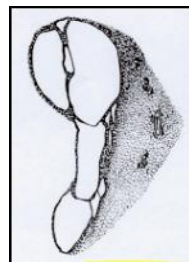
# Congenital pulmonary airway malformation (CPAM)

When seen antenatally a CPAM may:

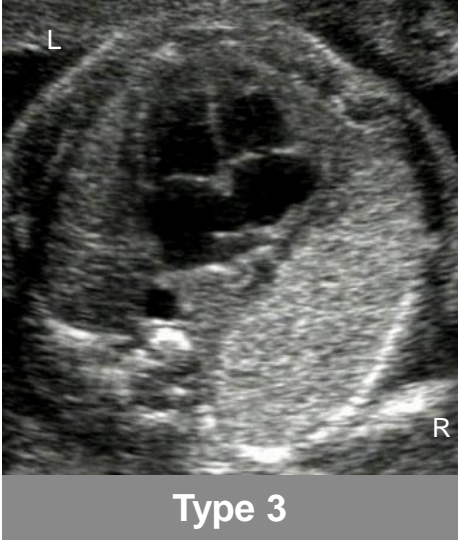
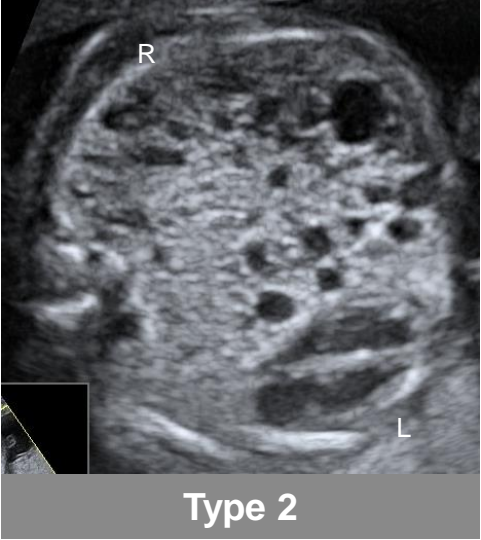
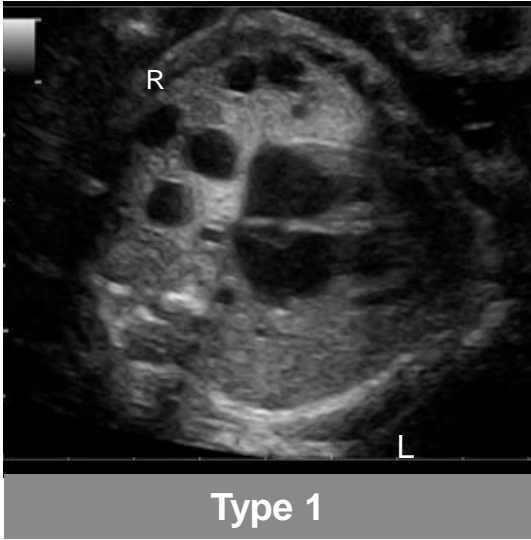
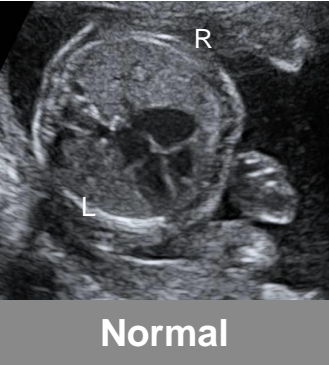
- Increase in size
- Remain stable throughout the pregnancy
- Regress to the point it is no longer detectable by ultrasound

As a CPAM may create a mass effect displacing the heart, the pregnancy should be followed to ensure there is no progression to hydrops. Conversely, compression of normal lung tissue can result in pulmonary hypoplasia.

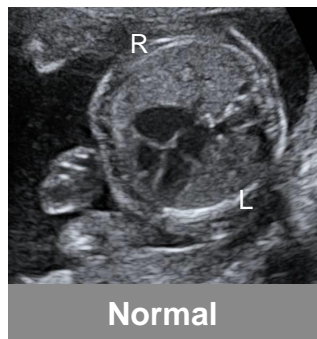
Postnatal surgery may be required with type 1 lesions offering the best prognosis.



# Congenital pulmonary airway malformation (CPAM)



# Significant pleural effusion (>4 mm)



Normal



Significant left sided pleural effusion (14 wks)

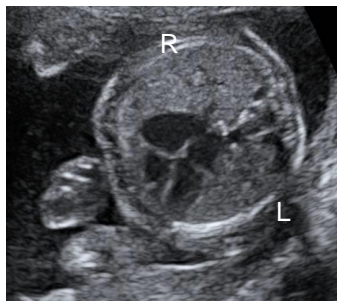


Right sided pleural effusion (mild)



Significant bilateral pleural effusions R>L

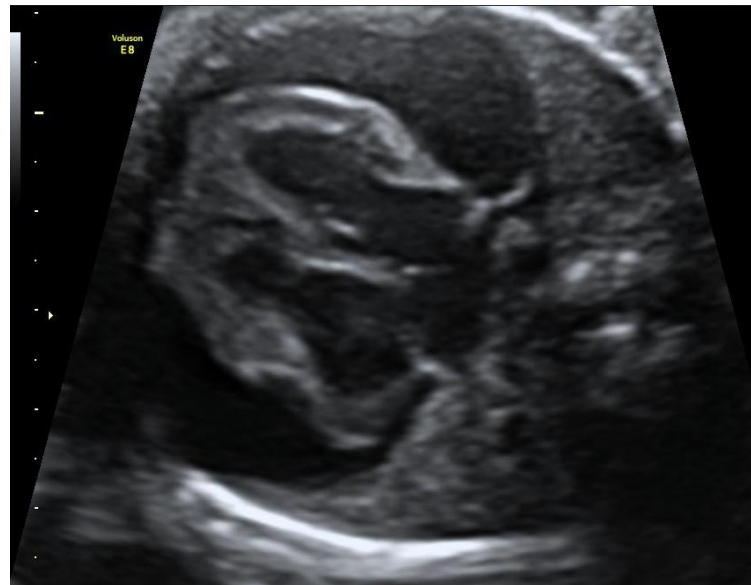
# Significant pericardial effusion (>4 mm)



Normal



Right sided pleural effusion



Pericardial effusion

# Key points

1. Sliding between planes 6,7 & 10 allows identification of the most common pathologies of the neck & the chest
2. Always double check the structures with a sagittal & parasagittal sweep
3. Verify echogenicity & homogeneity of the lungs
4. Your role is to distinguish between the range of normal & abnormal appearances
5. Any appearance which you cannot confirm as normal should be referred for a more experienced opinion



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